

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-30. (Canceled)

31. (Previously Presented): A method for augmented reality guided positioning of a real instrument tip within a real target located in a real object comprising the steps of:

presenting an augmented reality view by overlaying a virtual graphics guide onto a real view of the real object and a real instrument, the graphics guide comprising a virtual depth marker located outside of the real object;

aligning the real instrument to the graphics guide;

inserting the real instrument to a depth determined in the augmented view by alignment of a predetermined real feature of the real instrument with the virtual depth marker, the real feature being located along the length of the real instrument at a certain distance from the real instrument tip, and remains external to the real object during insertion.

32. (Previously Presented): The method of claim 31 wherein the presenting step further includes interactive planning which comprises the steps of:

determining an optimal location for the real instrument with respect to the real target;

calculating the proximity of the predetermined portion of the real instrument to the real target based on the optimal location and the geometry of the real instrument;

using the proximity calculation to determine the position of the virtual depth marker on the virtual graphics guide.

33. (Previously Presented): The method of claim 32 wherein the proximity calculation comprises a range a proximity measurements.

34. (Previously Presented): The method of claim 32 wherein the proximity calculation corresponds to a final forward position of the predetermined portion of the real instrument with respect to the real target.

35. (Previously Presented): The method of claim 32 wherein the proximity calculation corresponds to a distance between the virtual depth marker and a point within the real target.

36. (Previously Presented): Apparatus for augmented reality guided instrument positioning of a real instrument tip within a real target located in an real object comprising:

a virtual graphics guide generator and positioner for generating and positioning a virtual graphics guide, the graphics guide comprising a virtual depth marker located outside of the real object; and

a rendering device for rendering the virtual graphics guide onto a real view of the real object and a real instrument such that the real instrument can be inserted to a depth determined in the augmented view by alignment of a predetermined real feature of the real instrument with the virtual depth marker, the real feature being located along the length of the real instrument at a certain distance from the real instrument tip, and remains external to the real object during insertion.

37. (Previously Presented): The apparatus of claim 36, wherein said virtual graphics guide generator and positioner determines an optimal location for the real instrument with respect to the real target, and calculates the proximity of

said predetermined portion of the real instrument to the real target based on the optimal location and the geometry of the real instrument.

38. (Previously Presented): The apparatus of claim 37, wherein the proximity comprises a range of proximities and said virtual graphics guide generator and positioner determines an optimal range of locations for the predetermined portion of the real instrument with respect to the real target, and calculates the range of proximities of the predetermined portion of the real instrument to the real target based on the optimal range and the geometry of the real instrument.

39. (Previously Presented): The apparatus of claim 37, wherein the proximity corresponds to a final forward position of the predetermined portion of the real instrument with respect to the real target.

40. (Previously Presented): The apparatus of claim 36, comprising further a display device to display the augmented view rendered by the rendering device to the user.